Collapse of Northern Grid

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Will the Minister of POWER be pleased to state:

(a) whether the Enquiry Committee has been appointed to find out the reasons for collapse of the Northern Gird;

(b) if so, the reasons for the collapse of the grid;

(c) the suggestions made by the Committee to avoid such collapses in future;

(d) whether a similar Committee was also appointed for collapse of a grid sometime back and what suggestions were made by that Committee for avoiding such collapse in future; and

(e) the steps being taken by Government to avoid similar collapse in other grids in the country?

THE MINISTER OF STATE IN THE MINISTRY OF POWER (SHRIMATI JAYAWANTI MEHTA): (a) to (c) A major gird disturbance resulted in the collapse of the Northern Regional Grid on 2nd January, 2001. An inquiry was ordered by the Government on 3rd January, 2001. The Chairman, Central Electricity Authority conducted the inquiry and submitted his report on 10th January, 2001. Several factors contributed to the grid collapse. One Pole of Rihand-Dadri HVDC line was out of service from 14th December, 2000 due to multiple failure of converter transformers. This had restricted the transmission capability between the eastern part, where all pit-head generation is located and western part of the Northern Region, where major load centres are located. On the night of 1st / 2nd January, 2001, a number of 220 KV and 400 KV lines of the U.P transmission system had tripped and this imposed a severe strain on the transmission system. The transmission capability which had been impaired due to reduced capability of the Rihand-Dadri HVDC line got further eroded due to tripping of major high voltage transmission lines in UP system and this triggered grid separation and collapse. The main recommendations of the

Commitee to avoid recurrence of such grid collapse are at Statement-I *(see* below).

(d) A Committee under the Chairmanship of Member (Grid & Operation), CEA was appointed to examine the causes leading to grid disturbance on 20.12.1996 and to suggest remedial measures. The remedial measures which were suggested by the Committee are given in Statement II (See below).

(e) Regional Load Despatch Centres (RLDCs) have been estabiished in each of the five regions to supervise, control and take appropriate measures with a view to operate the regional grids in accordance with Indian Electricity Grid Code evolved by Central Electricity Regulatory Commission for ensuring safety and security of the grid. Minister of Power has addressed a letter to all the Chief Ministers advising them to ensure grid discipline by restricting their drawals from the grid in accordance with their allocated quota and grid requirement. The important preventive measures being taken to avoid incidents of grid failure in future are as follows:

1. Periodic preventive and regular maintenance of all HVDC, 400 KV and 20 KV lines and sub- stations.
2. Introduction of free governor mode of operation at all generating stations.
3. Ensuring proper operation of under frequency load shedding relays in SEBs distribution systems.
4. Implementaion of a rational commercial mechanism which would induce SEBs to regulate their drawal and the generators to generate power according to schedules, to enable stabilization of voltage and frequency.
5. Installation of capacitors at load centres of State Electricity Boards.

Statement-I

Recommendations of the Committee which conducted the Enquiry in respect of Grid Failure on 2.1.2001

(i) A time-bound Action Plan may be prepare for properly tuning the governors of BBMB to cater to Black Start conditions.

(ii) The action to be taken for reactive support for charging 400K V Panipat-Dadri line may be finalised.

(iii) 400K V circuit breakers at Panipat may be replaced with SF6 Circuit Breakers.

(iv) The feasibility of self-start facilities at Faridabad and for extending power from Faridabad CCGT to Badarpur may be examined.

(v) The revised Under Frequency Relay Scheme, both in respect of flat and df/dt relays, may be implemented.

(vi) A time-bound programme may be prepared for providing Event Loggers and Disturbance Recorders at all major generating stations and sub-stations including steps to be taken for their timely synchronization.

(vii) Immediate action may be taken to review the protection scheme for 400 KV Unnao-Agra line. Also periodic preventive and regular maintenance of its 400 and 220 KV sub-stations and lines, including washing of the line insulators in the portions passing through the high pollution vulnerable areas, may be carried out.

(viii) Necessary facilities may be provided so that instructions from NRLDC can be passed on directly to Singrauli-Rihand control rooms.

(ix) An Action Plan for installing Real Time Voice Recording Facility at all RLDCs may be prepared.

(x) Simulator training may be arranged on load despatching to all engineers engaged in load despatch activity at the RLDC and SLDCs.

(xi) The feasibility of introducing "Expert Systems" for contingency analysis and restoration may be examined.

(xii) A time bound programme for expediting the Unified Load Despatch Scheme may be worked out.

(xiii) Immediate action may be taken to repalce the Circuit Breakers of 132 KV Rihand-Singrauli line at Rihand.

(xiv) The existing Black Start Procedures for Northern Region may be reviewed and a modified Black Start Procedure may be prepared.

(xv) Detailed schemes for islanding of RAPP, NAPP and Delhi may be finalised.

(xvi) The transmission works, which require immediate completion may be identified and taken up on priority basis.

(xvii) Detailed simulation study for evolving suitable stable arrangements for providing start up power for Dadri TPS may be undertaken.

(xviii) A time bound Action Plan for improving the performance of the HVDC Rihand-Dadri Bipole may be prepared.

(xix) Annual workshops of load despatch personnel and systems operators may be conducted to improve their understanding of the system and to meet the emerging challenges.

Statement-II

Remedial Measures Suggested by the Committee under the Chairmanship of Member (Grip & Operation), CEA Appointed to Examine the Causes Leading to Grip Disturbance on 20.12.1996 and to Suggest Remedial Measures

1. Improving voltage profile, installation of additional shunt capacitors and reduction of under voltage relay setting of shunt capacitors banks,
2. Preventive maintenance at 400/220 KV switchyards of NTPC,
3. Schedule maintenance of all the equipments to avoid equipment failure,
4. Enhancement of reliability of Rihand-Dadri HVDC system
5. Inter-connection of two 220 KV buses at Dadri NCTPS and gas turbinbe stations,
6. Modification/upgradation of protection scheme provided on 400 KV Dadri-Panipat line at Panipat,
7. Revival of full capacity of SVC Station at Kanpur,
8. Free governor operation of the thermal units of 200 MW and above and hydro units of 100 MW and above,
9. Modification in the islanding scheme of DESU system,
10. Reliable black start facilities for Singrauli/Rihand STPPS by providing AC by-pass between 400 KV north and west buses at Vindhyachal HVDC back-to-back station,
11. Formalization of start-up procedures for speedy restoration of Northern Grid,
12. Periodic operation system studies to be carried out by NRLDC for the dynamic stability of the system including contingency evaluation.